

Appn. No. 09/976,299

Attorney Docket No. 11721-034

I. Listing of Claims

1. (Currently amended): A method of controlling the activation of occupant restraints in a motor vehicle for a high g event, said method comprising:

(a) upon sensing said event, activating an automatic locking restraint of a seat belt upon sensing the high g event;

(b) activating a pre-tensioner of said seat belt after the activating the automatic locking restraint; and

(c) activating an air bag after the activating the pre-tensioner.

2. (Original): The method of claim 1, further comprising enabling one or more of the group consisting of said automatic locking restraint, said pre-tensioner and said air bag prior to the occurrence of said event.

3. (Original): The method of claim 1, wherein one or more of the group consisting of said automatic locking restraint, said pre-tensioner and said air bag is activated after the occurrence of said event.

4. (Cancelled)

5. (Cancelled)

6. (Previously presented): The method of claim 1, wherein said automatic locking restraint is activated about 5 milliseconds after the occurrence of said event and said pre-tensioner is activated after 5 milliseconds to about 10 milliseconds after the occurrence of said event.

7. (Previously presented): The method of claim 6, wherein said air bag is activated after 10 milliseconds.

8. (Currently amended): A method of managing the enablement and disablement of occupant restraints in a motor vehicle, said method comprising:

(a) determining if a seat belt of a seat is buckled; and



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(b) in response to the determination of step (a), enabling or disabling at least one occupant restraint of the group that consists of an automatic locking restraint, a pre-tensioner and an air bag, the enabled occupant restraints being activated in a sequence in which the automatic locking restraint is activated before the pre-tensioner and the air bag and the pre-tensioner is activated before the air bag.

9. (Original): The method of claim 8, further comprising:

(c) determining if a weight in said seat is less than a threshold weight.

10. (Original): The method of claim 9, further comprising:

(d) if step (a) determines that the seat belt is buckled and if step (c) determines that said weight in said seat is less than the threshold weight, disabling said air bag and enabling said automatic locking restraint and said pre-tensioner.

11. (Original): The method of claim 9, further comprising:

(e) if step (a) determines that the seat belt is unbuckled and if step (c) determines that said weight in said seat is less than the threshold weight, disabling said air bag and said pre-tensioner.

12. (Original): The method of claim 9, further comprising:

(f) if step (a) determines that the seat belt is unbuckled and if step (c) determines that said weight in said seat is equal to or greater than the threshold weight, enabling said air bag and disabling said pre-tensioner.

13. (Original): The method of claim 9, further comprising:

(g) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is equal to or greater than said threshold, performing a procedure that enables the air bag, the automatic locking restraint and the pre-tensioner.



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14. (Original): The method of claim 13, further comprising:

(h) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is equal to or greater than said threshold, determining if the seat belt is extended and, if not, performing step (g); and

(i) if step (h) determines that the seat belt is extended, disabling said air bag and enabling said automatic locking restraint and said pre-tensioner.

15. (Original): The method of claim 9, further comprising:

(j) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is less than said threshold, enabling said air bag to inflate with a procedure that provides a soft inflation impact on said occupant.

16. (Original): The method of claim 15, wherein step (i) also enables said automatic locking restraint and said pre-tensioner.

17. (Original): The method of claim 16, further comprising signaling an alert if step (j) is performed.

18. (Original): The method of claim 8, further comprising:

(k) determining a weight in said seat as measured by a weight sensor system;

(l) if said weight is greater than a threshold weight, determining if said seat belt is tightened;

(m) if step (l) determines that said seat belt is tightened, determining an adjusted weight; and

wherein step (b) enables said at least one occupant restraint dependent on a comparison of said adjusted weight and said threshold weight.

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19. (Original): The method of claim 18, further comprising:

(n) if said adjusted weight is less than said threshold weight, disabling said air bag and enabling said automatic locking restraint and said pre-tensioner.

20. (Original): The method of claim 19, further comprising:

(o) if said adjusted weight is equal to or greater than said threshold weight, enabling said air bag, said automatic locking restraint and said pre-tensioner.

21. (Original): The method of claim 18, wherein step (1) determines seat belt tightening by comparing values measured by said sensor system at about the rear right and rear left of said seat.

22. (Original): The method of claim 21, wherein step (m) derives said adjusted weight from said values.

23. (Original): The method of claim 22, wherein step (m) determines said adjusted weight only if the difference between said values is greater than a predetermined amount.

24. (Original): The method of claim 18, wherein steps (l) and (m) are repeated until a predetermined time has expired from the time the seat has been buckled.

25. (Previously presented): The method of claim 13, further comprising:

(p) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is equal to or greater than said threshold, determining if the seat belt is extended and, if not, performing step (d); and

(q) if step (p) determines that the seat belt is extended, enabling a

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manual locking restraint.

26. (Original): The method of claim 25, further comprising:

(r) enabling said air bag with an inflation procedure that provides a soft inflation impact on said occupant.

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Currently amended): A system for managing the enablement and disablement of occupant restraints on an occupant in a seat having a seat belt in a motor vehicle, said system comprising:

a plurality of occupant restraints selected from the group consisting of an automatic locking restraint, a pre-tensioner and an air bag device;

a processor, a memory and a bus that interconnects said processor, said memory and said plurality of occupant restraints;

a load management procedure stored in said memory that controls said processor to perform the following steps:

(a) determining if said seat belt is buckled; and

(b) in response to the determination of step (a), enabling or disabling at least one of said occupant restraints, the enabled occupant restraints being activated in a sequence in which the automatic locking restraint is activated before the pre-tensioner and the air bag and the pre-tensioner is activated before the air bag.

31. (Original): The system of claim 30, said load management procedure further comprising:

(c) determining if a weight in said seat is less than a threshold weight.

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32. (Original): The system of claim 31, said load management procedure further comprising:

(d) if step (a) determines that the seat belt is buckled and if step (c) determines that said weight in said seat is less than the threshold weight, disabling said air bag and enabling said automatic locking restraint and said pre-tensioner.

33. (Original): The system of claim 31, said load management procedure further comprising:

(d) if step (a) determines that the seat belt is unbuckled and if step (c) determines that said weight in said seat is less than the threshold weight, disabling said air bag and said pre-tensioner.

34. (Original): The system of claim 33, said load management procedure further comprising :

(f) if step (a) determines that the seat belt is unbuckled and if step (c) determines that said weight in said seat is equal to or greater than the threshold weight, enabling said air bag and disabling said pre-tensioner.

35. (Original): The system of claim 31, said load management procedure further comprising:

(g) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is equal to or greater than said threshold, performing a procedure that enables the air bag, the automatic locking restraint and the pre-tensioner.

36. (Original): The system of claim 35, said load management procedure further comprising:

(h) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is equal to or greater than said threshold, determining if the seat belt is extended and, if not, performing

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step (g); and

(l) if step (h) determines that the seat belt is extended, disabling said air bag and enabling said automatic locking restraint and said pre-tensioner.

37. (Original): The system of claim 31, said load management procedure further comprising:

(j) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is less than said threshold, enabling said air bag to inflate with a procedure that provides a soft inflation impact on said occupant.

38. (Original): The system of claim 37, wherein step (j) also enables said automatic locking restraint and said pre-tensioner.

39. (Original): The system of claim 38, said load management procedure further comprising signaling an alert if step (j) is performed.

40. (Original): The system of claim 30, said load management procedure further comprising:

(k) determining a weight in said seat as measured by a weight sensor system;

(l) if said weight is greater than a threshold weight, determining if said seat belt is tightened;

(m) if step (l) determines that said seat belt is tightened, determining an adjusted weight; and

wherein step (b) enables said at least one occupant restraint dependent on a comparison of said adjusted weight and said threshold weight.

41. (Original): The system of claim 40, said load management procedure further comprising:

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(n) if said adjusted weight is less than said threshold weight, disabling said air bag and enabling said automatic locking restraint and said pre-tensioner.

42. (Original): The system of claim 41, said load management procedure further comprising:

(o) if said adjusted weight is equal to or greater than said threshold weight, enabling said air bag, said automatic locking restraint and said pre-tensioner .

43. (Original): The system of claim 40, wherein step (l) determines seat belt tightening by comparing values measured by said sensor system at about the rear right and rear left of said seat.

44. (Original): The system of claim 43, wherein step (m) derives said adjusted weight from said values.

45. (Original): The system of claim 44, wherein step (m) determines said adjusted weight only if the difference between said values is greater than a predetermined amount.

46. (Original): The system of claim 40, wherein steps (l) and (m) are repeated until a predetermined time has expired from the time the seat has been buckled.

47. (Previously presented): The system of claim 35, said load management procedure further comprising:

(p) if step (a) determines that the seat belt is buckled and step (c) determines that said weight in said seat is equal to or greater than said threshold, determining if the seat belt is extended and, if not, performing step (g); and

(q) if step (p) determines that the seat belt is extended, enabling a

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manual locking restraint.

48. (Original): The system of claim 47, said load management procedure further comprising:

(r) enabling said air bag with an inflation procedure that provides a soft inflation impact on said occupant.

49. (Cancelled):

50. (Cancelled):

51. (Cancelled):

52. (Currently amended): A memory medium for controlling a processor that controls the enablement and disablement of occupant restraints in motor vehicle, said memory medium comprising:

means for controlling said processor to determine if a seat belt of a seat is buckled; and

means for controlling said processor in response to the determination of whether said seat belt is buckled, to enable or disable at least one occupant restraint of the group that consists of an automatic locking restraint, a pre-tensioner and an air bag, the enabled occupant restraints being activated in a sequence in which the automatic locking restraint is activated before the pre-tensioner and the air bag and the pre-tensioner is activated before the air bag.

53. (Original): The memory medium of claim 52, further comprising:

means for controlling said processor to determine a weight in said seat as measured by a weight sensor system;

means for controlling said processor if said weight is greater than a threshold weight, to determine if said seat belt is tightened;

means for controlling said processor if said seat belt is tightened, to

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determine an adjusted weight; and

wherein step said at least one occupant restraint is enabled dependent on a comparison of said adjusted weight and said threshold weight.

54. (Cancelled)

55. (Currently amended): A memory medium for controlling a processor that controls the activation of occupant restraints in a motor vehicle in response to a high g event, said memory medium comprising:

means for controlling said processor in response to said event to activate an automatic locking restraint of a seat belt;

means for controlling said processor to activate a pre-tensioner of said seat belt after the activation of the automatic locking restraint; and

means for controlling said processor to then activate an air bag after the activation of the pre-tensioner.

56. (Cancelled)

57. (Previously presented): The method of claim 8, further comprising:

(s) if step (a) determines that said seat belt is buckled, detecting if said seat is unoccupied; and

(t) if said seat is unoccupied, recording the unoccupied status of said seat.

58. (Previously presented): The method of claim 57, further comprising:

(u) if a weight in said seat is less than a threshold weight, disabling said air bag and said pre-tensioner.

59. (Previously presented): The method of claim 57, further comprising:

(v) if a weight in said seat is equal to or greater than a threshold weight, enabling said air bag and disabling said pre-tensioner.

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60. (Cancelled)

61. (Cancelled)

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